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sang (Niederrhein. Gesell. für Natur-und Heilkunde, 1862). A similar diorite has been mentioned by Reinhold[1] as occurring in Placer county, Cal. (vid. NATURALIST, 1882, p. 610).——Michel-Lévy[2] has established seven different types of volcanic rock occurring in and near Mont Dore, in Central France. They include domite, cinerite, trachyte, andesite, phonolite and basalt.

BOTANY.[3]

HYBRIDIZATION OF POTATOES.—During the past year some experiments were made at Reading, England, upon the grounds of Messrs. Sutton & Sons, the eminent potato growers. Under the advice of Mr. J. G. Baker the attempt was made to secure a hybrid between the common potato and the Darwin potato (*Solanum maglia*) from the southern part of South America. The experiment is reported as having been successful, and we may look ere long for the tubers of this new form. "Every gardener and farmer may now welcome the birth, so to speak, of a hybrid which we may hope will enable the potato plant to resist the attack of parasites, and especially of those of the devastating fungus, *Peronospora infestans.*"

HETEROECISM OF CEDAR APPLES.—Dr. Farlow has been studying the cedar apples (species of Gymnosporangium) with a view to determining whether the cluster cups (species of Rœstelia) of the apple (Pirus), hawthorn (Cratægus) and June-berry (Amelanchier) are stages of the fungus which occurs on species of cedars (Juniperus). In a recent paper read before the American Academy of Arts and Sciences, the results of a series of experiments are given, the general bearing of which is in favor of the doctrine of heteroecism. After discussing the difficulties and the objections which may be raised, the author says that "the conclusions to be drawn are, that:

"1. The æcidium of *Gymnosporangium biseptatum* is probably *Rœstelia botryapites* [on Amelanchier].

"2. The æcidium of *G. globosum* (to be kept distinct from *G. fuscum*) is possibly *Rœstelia aurantiaca* [on *Cratægus oxycantha*].

"3. The æcidium of *G. macropus* is to be sought among the Rœsteliæ growing especially on apples and Amelanchier."

NORTH AMERICAN FORESTS.—The North American continent, or that part of it situated north of Mexico, may be conveniently divided, with reference to its forest geography, into the Atlantic and the Pacific regions by a line following the eastern base of the Rocky mountains and its outlying eastern ranges from the Arctic circle to the Rio Grande. The forests which cover these two divisions of the continent differ as widely in natural features, composition and distribution, as the climate and topography of Eastern America differ from the climate and topography of the Pacific slope. The causes which have produced the dissimilar composition of these two forests must be sought in the climatic conditions of a geological era earlier than our own and in the actual topographical formation of the continent.

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[1] Proc. Philad. Acad. Nat. Science, 1882, p. 59.

[2] *Comptes Rendus*, T. XCVIII, 1884, p, 1394.

[3] Edited by PROF. C. E. BESSEY, Lincoln, Nebraska.

The forests of the Atlantic and the Pacific regions, dissimilar in composition in the central part of the continent, are united at the north by a broad belt of sub-arctic forests, extending across the continent north of the fiftieth degree of latitude. One half of the species of which this northern portion is composed, extends from the Atlantic to the Pacific; and its general features, although differing east and west of the continental divide, in conformity with the climatic conditions peculiar to the Atlantic and the Pacific sides of the continent, still possess considerable uniformity. The forests of the Atlantic and the Pacific regions are also united at the south by a narrow strip of the flora peculiar to the plateau of Northern Mexico, here extending northward into the United States. Certain characteristic species of this flora extend from the Gulf of Mexico to the shores of the Pacific, and while the peculiar features of the eastern and the western slopes of the interior mountain system of the continent are still maintained here, the Atlantic and the Pacific regions of the Mexican forest belt possess many general features in common. Typical North American species, moreover, peculiar to the forests of the Atlantic or of the Pacific, mingle upon the Black hills of Dakota and upon the Guadalupe and other mountains of Western Texas, the extreme eastern ridges of the Rocky Mountain range and the outposts between the Atlantic and the Pacific regions.—*Professor Sargent in Vol. ix of the 10th Census of the United States.*

THE FERTILIZATION OF THE LEATHER-FLOWER (CLEMATIS VIORNA).—The leather-flower is a rather curious plant, climbing by means of its leaf-stalks among the low underbrush. The flower (Fig. 1) it bears is bell-shaped and hangs pendent from a somewhat long peduncle, which extends in a horizontal direction. It has no petals; four sepals taking their place. These are very thick and leathery, and are colored purplish without. The edges and inner part of the sepals are white. The tips are recurved, and these, together with the white edges of the sepals, perhaps serve as guide marks, directing the insect to the entrance below as a means of obtaining the honey. The bee, which I find to be the fertilizing agent, holds to the recurved tips of the sepals while effecting its honey-gathering, and this is the more obvious purpose of these tips. The outer stamens begin to open first, then those next within, being in advance of the pistils.

But before the inner stamens are ready to shed their pollen, the stigmas are also ready, so that were it not for a very ingenious arrangement, pollination would easily take place. The back of the anthers and the entire surface of the little tips extending above them are hairy. So are likewise the styles (Fig. 3). The calyx is closely contracted at its opening, pressing together the numerous stamens and pistils into a compact mass. Owing to the greater size of the pistils, the stigmas extend beyond the anthers (Fig. 4), and since the close packing brings the hairs on the anthers into play, the pollen does not escape. But at a later period the pressure of the sepals relaxes, the stamens are looser, and self-fertilization is not absolutely impossible, but certainly unnecessary, judging by the frequent visits of bees. The insertion of the bee's proboscis releases the pollen, which falls upon the abdomen and thorax, to be left upon the more prominent stigmas of the next blossom. The nectary is at the base of the filament.—*Aug. F. Foerste, Granville, Ohio.*

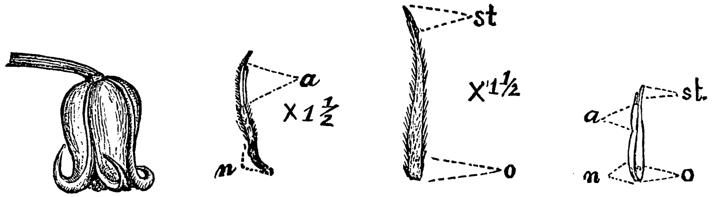

Fig. 1. Fig. 2. Fig. 3. Fig. 4.

FIG. 1.—A flower, natural size. FIG. 2.—A stamen enlarged 1½ times; *a*, the anther; *n*, the nectary. FIG. 3.—A pistil enlarged 1½ times; *o*, the ovary; *st*, the stigma; FIG. 4.—A pistil and a stamen about natural size, showing relative length.

PLANT MIGRATIONS.—Fifteen years ago there were no dandelions in the Ames flora (in Central Iowa), now they are very abundant, and have been for half a dozen years. Then there were no mulleins (*Verbascum thapsus*), now there are a few. Then the low and evil-smelling *Dysodia chrysanthemoides* grew by the roadside in great abundance, now it is scarcely to be found, and is replaced by the introduced "dog-fennel" (*Anthemis cotula*). Then the small fleabane (*Erigeron divaricatum*) abounded on dry soils, now it is rapidly disappearing. Then no squirrel-tail grass (*Hordeum jubatum*) grew in the flora, now it is very abundant, and has been for ten years. Then there was no bur-grass in the flora, now it is frequently found, and appears to be rapidly increasing. Both of these grasses have apparently come in from the west and north-west. Fifteen years ago the low amaranth (*Amarantus blitoides*) was rather rarely found; now it is abundant and has migrated fully 150 miles north-eastward. This plant has certainly come into the Ames flora from the south-west within the last twenty years.

In Nebraska, I am informed by the old settlers, that there have been notable migrations of plants within the past twenty or thirty years. The buffalo grasses of various kinds were formerly abundant in the eastern part of the State, now they have retreated a hundred to a hundred and fifty miles, and have been followed up by the blue-stems (Andropogon and Chrysopogon). The blue-stems now grow in great luxuriance all over great tracts of the plains of Eastern Nebraska, where twenty years ago the ground was practically bare, being but thinly covered by buffalo grasses. In Dakota it is the same, the blue-stems are marching across the plains, and turning what were once but little better than deserts into grassy prairies.—*Charles E. Bessey.*

GRAY'S BOTANICAL CONTRIBUTIONS, 1884–'85.—These occupy fifty-four pages of the Proc. Amer. Acad. Arts and Sci., and bear date of January 26, 1885. There are four parts, as follows: I. A revision of some Borragineous genera. II. Notes on some American species of Utricularia. III. New genera of Arizona, California and their Mexican borders, and two additional Asclepiadaceæ. IV. Gamopetalæ Miscellaneæ.

In the first section, after a discussion of various structural points, a revision of the Eritrichieæ is proposed which suppresses the genus Eritrichium (the name however being retained for a section of Omphalodes). The species are distributed among the genera Omphalodes, Krynitzkia, Plagiobothrys and Echidiocarya. In the second section certain obscurities in connection with the synonymy of species of Utricularia are cleared away. In III the new genera are Veatchia (Anacardiaceæ), Lyonothamnus (Rosaceæ?), Pringleophytum (Acanthaceæ), Phaulothamnus (Phytolaccaceæ), represented by an interesting but uncomely shrub (*P. spinescens*) from N. W. Sonora, Himantostemma (Asclepiadaceæ), and Rothrockia (Asclepiadaceæ), the last dedicated to "my friend and former pupil, Dr. J. Trimble Rothrock, professor of botany in the University of Pennsylvania, at Philadelphia, a keen botanist and zealous teacher, an explorer both in Alaska and Arizona, author of a sketch of the Flora of Alaska, and of the botany of Wheeler's report upon the U. S. Surveys of Arizona and Southern California, and whose name it is well to commemorate in an Arizono-Mexican genus."

In Section IV the most important accession of species is a second Schweinitzia, viz., *S. reynoldsiæ*, discovered by Miss Mary C. Reynolds near St. Augustine and on the Indian river, Florida. —*Charles E. Bessey.*

BOTANICAL NOTES.—The second number of the Bulletin of the Washburn College Laboratory of Natural History (Topeka, Kansas) contains descriptions of a number of new· species of fungi, among which are two Phalli, viz., *Phallus collaris* and *P. purpuratus*, the first illustrated by several figures. *Simblum rubescens*, the curious plant of abominable odor and strange distribution, first described by Gerard in the *Torrey Bulletin*, is recorded as common in Shawnee county. The Kansas form is set off (without sufficient reason, as it appears to us) as the variety *kansensis*. *Lycoperdon rubro-flavum*, *L. sigillatum*, *L. rima-spinosum*, *L. tabacinum* (the last by J. B. Ellis) and *Geaster turbinatus* are other new species of Gasteromycetes. Lists of ferns, mosses, lichens, algæ and parasitic fungi complete this very interesting bulletin.——Part II of the Catalogue of Canadian Plants, by John Macoun, is a thick pamphlet of about 200 pages, devoted to the Gamopetalæ. Curiously the number of species in this part (908) is almost exactly the same as in the previous one, viz., 907. There is a great deal of exceedingly valuable information given upon the geographical range of species, and also much in the way of notes upon habitats.——Dr. Gray's memorial of George Bentham in the *American Journal of Science* for February, contains one of the fullest accounts of the very full life of the venerable botanist, whose death the world still mourns. " His life was a perfect and precious example, much needed in this age, of persevering and thorough devotion to science while unconstrained as well as untrammeled by professional duty or necessity. For those endowed with leisure, to ' live laborious days ' in her service, is not a common achievement."——Nos. 1 and 2 of the *Journal of Mycology* have been received, and we can only say at this time that the matter is, in the main, good, but that the editor has not yet succeeded in getting from his printers as good work as is desirable. This, however, will doubtless be improved in the future.

ENTOMOLOGY.

GENERIC POSITION OF POLYDESMUS OCELLATUS.—In a letter to Professor Packard the undersigned writes as follows :

In the AMERICAN NATURALIST, April, 1883, you have published a paper on " a new species of Polydesmus with eyes," which you have called *Polydesmus ocellatus*. As can be seen from your description given there, the new myriopod must be a species of the genus Craspedosoma Leach (Transac. Linn. Society, Vol. XI, p. 380, printed 1815), and not of the genus Polydesmus Latr.; for the latter genus is always characterized by the want of eyes and by the number of segments being twenty, whereas the former genus is characterized by oculi composed by multiseriated ocelli and by the number of segments being thirty or, in younger specimens, less, from twenty-seven to twenty-nine.

In consequence of the necessity of ranging your species in another genus, all the members of which are provided with eyes, the specific name *ocellatus* should be removed and another introduced instead of it. I propose the name *Craspedosoma packardii.*

As I have reason to suppose, you are probably not in possession of Dr. Fr. Meinert's paper on the Chilognatha of Denmark (Danmark's Chilognather, published 1868 in the Naturhistorisk Tidsskrift, 3 Række [= series], 5th Vol.), where the genera Poly-